# UNITED STATES PATENT AND TRADEMARK OFFICE

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| 10/801,861 | 03/17/2004 | Saku Egawa | 503.4366X00 | 1977 |

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| 20457 7590 07/10/2007 | | EXAMINER | |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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PTOL-90A (Rev. 04/07)

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *17 March 2004*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-14* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☒ Some *  c)☐ None of:

        1.☒ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date *03/17/2004*.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

## DETAILED ACTION

### *Drawings*

1.      The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, method for operating a self-propelled cleaning device wherein the looped travel path comprises a first vertical movement path that is substantially orthogonal with respect to the travel route along the wall surface, and a second vertical movement path, and the interval between these two movement paths is an odd-number multiple of half of the interval between the two adjacent looped travel paths must be shown or the feature(s) canceled from the claim. Figure 1 does not depict these limitations in detail. No new matter should be entered.

        Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New

Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next

Office action. The objection to the drawings will not be held in abeyance.

## Claim Rejections - 35 USC § 102

2.      The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3.      Claims **1-4** are rejected under 35 U.S.C. 102(b) as being unpatentable over

**Hwang et al. (Patent: 5,568,589).**

Regarding **claim 1**, Hwang discloses a self-propelled cleaning machine with

fuzzy logic control comprising:

-   Wheel motors (10a and 10b) (moving means) for moving a cleaning machine

    (see col. 1, lines 31-41; col. 1, line 65 - col. 2, line 9; Figures 1A-1C, 2, and

    4A-4B).

-   Control device (12) and running control circuit (14) (control means) for

    controlling the self propelled cleaning machine (see col. 1, lines 42-57;

    Figures 1A-1C, 2, and 4A-4B).

-   A direction sensor (23) (orientation angle detection) for detecting the change

    in the running direction of the cleaning machine (see col. 1, line 65 – col. 2,

line 9; col. 2, lines 22 – 30; col. 2, lines 56-65; col. 5, lines 15-24; Figures 1A-
1C, 2, and 4A-4B).

- A plurality of distance sensors (3a-3g) (wall surface detection means) for

  sensing the presence of an obstacle (see abstract; col. 4, lines 28 – 34; col. 5,

  lines 25 – 33; Figure 4A – 4B).

- Control device (12) for moving the cleaning machine across the room

  perimeter (rectangular travel path) and defining a running path (PATH2) by

  connecting the ends of the parallel lines (LINES) in alternating direction (see

  col. 5, lines 1 – 24; col. 6, lines 4 – 16; col. 6, lines 40 – 63; Figures 5A-5D).

Regarding **claims 2** and **3**, Hwang discloses a plurality of distance sensors (3a-

3g) (wall surface detection means) for sensing the presence of an obstacle. As the

obstacle is detected, it would be inherent for the cleaning machine to move alongside

(left or right) the obstacle to avoid contact  (see abstract; col. 4, lines 28 – 34; col. 5,

lines 25 – 33; Figure 4a – 4b).

Regarding **claim 4**, Hwang discloses a RAM unit (27) for storing wall

coordinates, in which the CPU (24) define the area to be clean as a polygon consisting

of lines connecting the stored center coordinates X (see col. 6, lines 26 – 48; Figure 5A

– 5D).

4.      Claim **5** is rejected under 35 U.S.C. 102(b) as being unpatentable over **Hwang et**

**al. (Patent: 5,568,589).**

Regarding **claim 5**, Hwang discloses a method for operating a self-propelled

cleaning machine with fuzzy logic control comprising the step of:

- Causing the cleaning machine to travel across the room perimeter and in parallel line trajectories (plurality of looping travel paths) (see col. 5, lines 14-33; col. 6, lines 4- col. 7, lines 7; Figures 5A – 5D).

- Detecting reference direction across the room perimeter (see col. 5, lines 1-33; col. 6, lines 4- col. 7, lines 7; Figures 5A – 5D).

- Determine the parallel line trajectories for the cleaning machine (see col. 6, lines 40 - col. 7, lines 7; Figures 5A – 5D).

5.      Claims **6-9** are rejected under 35 U.S.C. 102(b) as being unpatentable over **Hwang et al. (Patent: 5,568,589).**

Regarding **claims 6 - 10**, Hwang discloses a method for operating a self-propelled cleaning machine with fuzzy logic control comprising the step of:

- Detecting wall surface by implementing a plurality of distance sensors (3a-3g) for sensing the presence of an obstacle. As the room wall is detected, it would be inherent for the cleaning machine to move alongside (left or right) the wall/obstacle to avoid collision by implementing direction sensor (23) (see abstract; col. 4, lines 28 – 34; col. 5, lines 25 – 33; Figures 4a – 4b).

- Making a plurality of spiral travel turns across the room perimeter (first/ second horizontal movement path and first/second vertical movement path) after the wall surface is detected (see col. 5, lines 1 – 24; col. 6, lines 4 – 16; col. 6, lines 40 – 63; Figures 5A-5D).

- As the cleaning machine move across the room perimeter, it would be

inherent that the direction sensor (23) in coordination with control device (12)

would set the correct turning direction for the cleaning machine to accomplish

its trajectory (see Figures 5A-5B).

Regarding **claims 9-10**, Hwang discloses a method for adjusting the cleaning

machine trajectory path across the room before begin cleaning (first horizontal

movement path) (PATH1) by implementing a position discrimination circuit (15) and

RAM unit (27). Unit (27) is capable to store wall coordinates, in which the CPU (24)

define the area to be clean as a polygon consisting of lines connecting the stored center

coordinates X (see col. 6, lines 26 – 48; col. 6. line 53 – col. 7, line 7; Figure 5A – 5D).

## Claim Rejections - 35 USC § 103

6.      The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7.      Claims **11-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over

**Hwang et al. (Patent: 5,568,589).**

Regarding **claim 11**; Hwang discloses a method for making a plurality of spiral

travel turns across a room perimeter (first/second vertical movement path) after the wall

surface is detected. As the cleaning machine moves across the horizontal paths, which

can be vertical paths as the Figure 5D is rotated, there is an odd-number multiple of the

space interval between the adjacent looped travel paths (see col. 5, lines 1 – 24; col. 6, lines 4 – 16; col. 6, lines 40 – 63; Figures 5A-5D).

However, Hwang fails to disclose or depicts an interval between two-movement paths as an odd-number multiple of half of the interval between the two adjacent looped travel paths.

However, the control device (12) can be programmed to drive the cleaning machine such as the interval space is an odd-number multiple of half of the adjacent looped travel paths.

Doing so would enhance a self-propelled cleaning machine capable to cover more area per total number of looped travel paths.

Regarding **claim 12**, Hwang depict an interval between two adjacent looped travel paths as a one times the widths area clean by cleaning machine (see Figure 5D).

Regarding **claims 13-14**; Hwang discloses a method for operating a self-propelled cleaning machine with fuzzy logic control, which uses wheel motors (10a and 10b), control device (12), running control circuit (14), a direction sensor (23), a plurality of distance sensors (3a-3g) (wall surface detection means), a plurality of wall surface segments (see abstract; col. 1, line 65 – col. 2, line 9; col. 2, lines 22 – 30; col. 2, lines 56-65; col. 4, lines 28 – 34; col. 5, lines 15-24; col. 5, lines 25 – 33; Figure 4A – 4B) comprising the step of:

-   Moving the cleaning machine (first step) until it approaches a wall (see col. 6, lines 4-26; Figure 5A).

- Moving and rotating (right/left side and/or around the obstacle) (second step) the cleaning machine across the room (walls) (see col. 6, lines 4-26; Figure 5A).

- Comparing the rotation angle of the cleaning machine with the intended direction path of the cleaning machine (second step) by implementing apposition discrimination circuits (15) and direction sensor (23).

However, Hwang fails to disclose a method for selecting the result of comparison to be equality when the first direction is clockwise and the second direction is right-side, or the first direction is counterclockwise and the second direction is left-side, and a fourth step of rotating the cleaning device by a prescribed angle and repeating the process from the first step when the result of comparison in the third step is equality.

However, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to generate a computer program (C++ language) to select a result of the comparison to be equal when the first direction is clockwise and the second direction is right side or the first direction is counterclockwise and the second direction is left side, which is a well known technique for rotation and turning comparison. Furthermore, as Hwang discloses a method for rotating the cleaning machine to a determine angle to correct angular deviation (see col. 6, lines 64 – col. 7, lines 13), it would have been obvious to one of ordinary skill in the art at the time of the invention was made to generate a program (IF or WHILE condition) for repeating a process from the moving process (first step) when the result of comparison in the comparison process (third step) is equal.

Doing so would enhance a self-propelled cleaning machine capable to autonomously rotate and direct its system.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jorge O. Peche whose telephone number is 571-270-1339. The examiner can normally be reached on 8:30 am - 5:30 pm Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G. Black can be reached on 571-272-6956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.
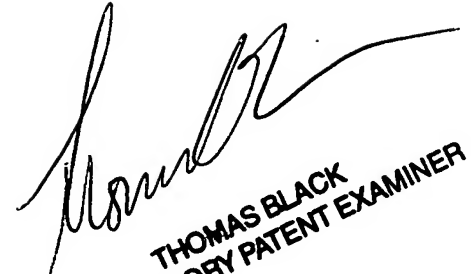
Jorge O. Peche

Patent Examiner
Art Unit 3661
June 22, 2007

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SUPERVISORY PATENT EXAMINER